

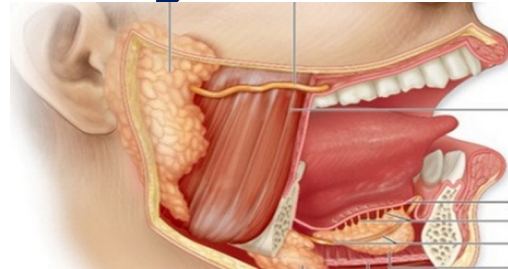


Armed Forces College of Medicine AFCM



Lecture Title

Salivary Secretion



Lecturer Name

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INTENDED LEARNING OBJECTIVES (ILO)



- Name the salivary glands.
- Describe the salivary secretion: volume, pH and composition.
- Describe the different functions of saliva.
- Describe the regulation of salivary secretions.



Lecture Plan



1. Part 1 (5 min) Introduction
2. Part 2 (35 min) Main lecture
3. Part 3 (5 min) Summary
4. Lecture Quiz (5 min)

Secretions of GIT



- The total volume of GIT secretions is about 6-8 L/day.
- Secretions arise from specialized cells lining the GI tract, salivary glands, the pancreas and liver.
- GIT secretions function to lubricate (water and mucus), protect (mucus), sterilize (HCl), neutralize (HCO_3^-), and digest (enzymes).



Salivary Secretion



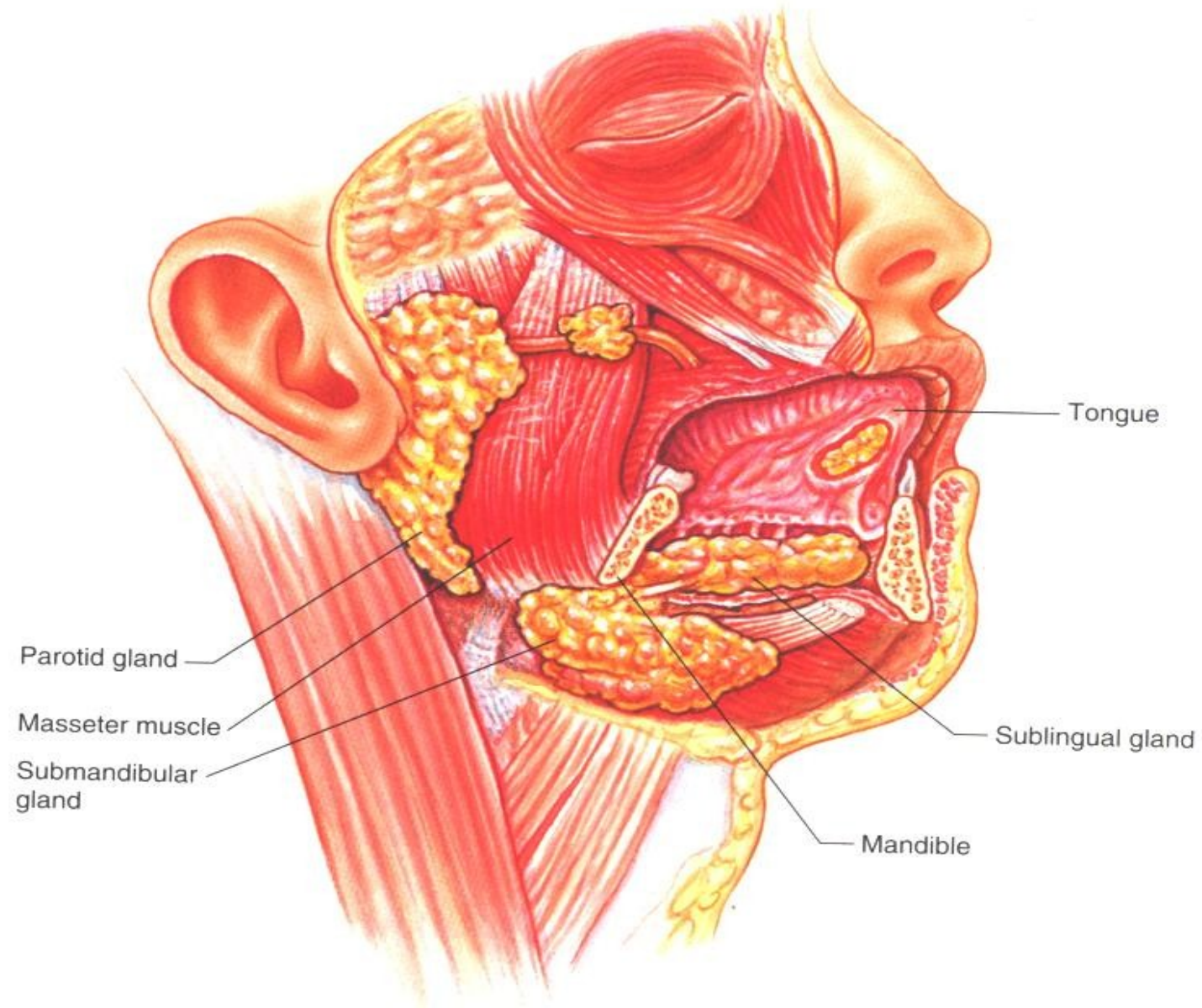
- Saliva is secreted by the **parotid**, **submandibular** and **sublingual** glands.



1500 ml per day



Salivary Glands



Composition of Saliva



Water



99.5%

Solids



0.5%

**Organ
ic**

**α - amylase, lingual lipase,
lysozyme, IgA , mucin and
lactoferrin**

**Inorga
nic**

like ECF



Composition of Saliva



pH → 7

➤ The acinus is formed of two types of secretory cells:

Serous cells:

serous (watery)
secretion
containing ptyalin
(α amylase
enzyme).

Mucous cells:

mucous
(viscous)
secretion
containing
mucin.



Types of Salivary Glands

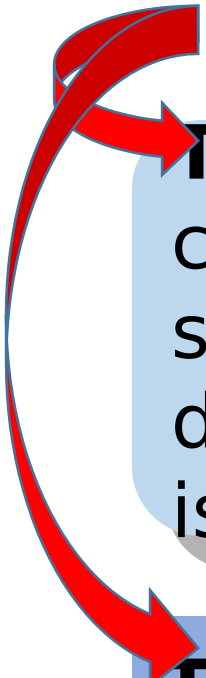


- The parotid glands acini are serous.
- The sublingual glands acini are mixed.
- The submandibular glands acini are mixed.



Mechanism of Salivary Secretions

Salivary secretion consists of two stages:



The first stage: a primary secretion that contains ptyalin and/or mucin in a solution of ions which shows no great difference from extracellular fluid and isotonic.

The second stage: modification occurs along the ducts.



Modification of Salivary Secretions



- **Sodium ions (Na^+)** are actively reabsorbed.
- **Potassium ions (K^+)** are actively secreted.
- **Bicarbonate ions (HCO_3^-)** are actively secreted into the lumen of the duct.
- Water is not reabsorbed. Therefore, the saliva that reaches the mouth is hypotonic to plasma.



Modification of Salivary Secretions



- The net result of these transport processes under resting conditions makes the concentration of Na^+ and Cl^- in saliva much less, whereas the concentrations of K^+ and HCO_3^- much more than in plasma.
- During maximal secretion is unlikely to occur and composition is near ECF.

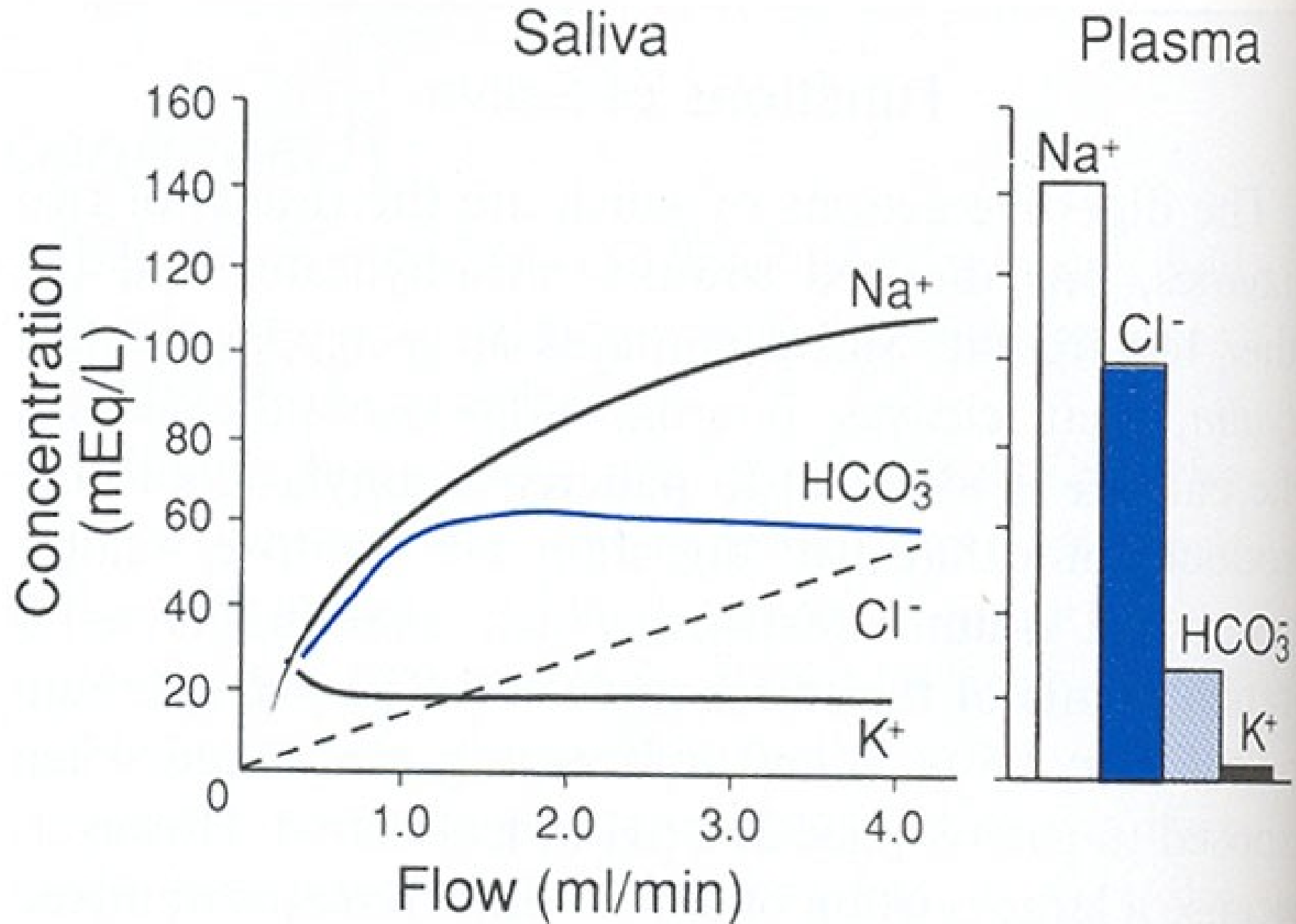


Which of the following is characteristic of saliva?

- (A) Hypotonicity relative to plasma
- (B) A lower HCO_3^- concentration than plasma
- (C) The presence of protease
- (D) Secretion rate that is increased by vagotomy
- (E) Modification by the salivary ductal cells involve reabsorption of K^+ and HCO_3^-

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Mechanism of Salivary Secretions

Protection of oral mucosa:

- Cooling hot foods.
- Neutralizing acid.
- Maintaining healthy oral mucosa through:
Washing away pathogenic bacteria and food remnants.
- **Lysozyme:** attacks the walls of bacteria.
- **IgA** destroys bacteria.
- **Lactoferrin:** bacteriostatic.



Functions of Saliva



Teeth protection:

- The buffers keep the oral pH at 7.0.
- Fluoride protects the teeth enamel.
- Proline-rich proteins protect teeth enamel and bind toxic tannins.



Functions of Saliva



Digestion:

- **ptyalin (α -amylase)**

- cleaves α -1,4-glycosidic bonds of starch.
- optimum pH 7.

Products of digestion: α dexstrins, maltitriose and maltose.

- **lingual lipase**

- triglycerides
- optimum pH is low, so it remains active in the stomach.



Functions of Saliva



Lubrication and Wetting:

- Swallowing.
- Speech.
- Taste.



Control of Salivary Secretions



Salivary secretions are regulated by nervous mechanisms only.

Innervation of salivary glands:

I) Parasympathetic innervation:

- Profuse secretion of watery saliva high in electrolytes and low content of organic material.
- Vasodilatation in the gland which is **due to local release of VIP and acetylcholine.**



Control of Salivary Secretions



II) Sympathetic innervation:

- secretion of a small amount of saliva rich in organic constituents.
- Vasoconstriction.

The secretion of saliva can occur in response to conditioned or unconditioned stimuli.



Control of Salivary Secretions



Conditioned Reflexes:

- An acquired reflex and needs training.
- The centre is in the cerebral cortex.
- The sight, smell, thought of food in the absence of food in the mouth increase salivary secretion.



Control of Salivary Secretions



unconditioned Reflexes:

The presence of food in the mouth results in reflex secretion of saliva.

Stimulus: presence of food in the mouth.

Receptors: taste buds.

Afferent: nerves from taste buds carry impulses to salivary centre.

Centre: salivary centre in medulla oblongata (in brain stem).

Efferent: autonomic nerves supplying salivary glands.





THANK
YOU



SUGGESTED TEXTBOOKS



Guyton textbook

Ganong textbook